REMARKS/ARGUMENTS

The Response filed February 28, 2006 was objected to as a non-compliant amendment because claims 31-60, which were withdrawn were not included in the Listing of Claims. In response, the Applicant has now included these claims in the Listing of Claims. This Response should now overcome the non-compliant objection.

Additionally, the Applicant reiterates the following Remarks/Arguments as a part of the Response to Notice of Non-Compliant Amendment.

Claims 1-60 are pending. Claims 1, 8, 20, 21, and 23 have been amended, and claims 2-7, 9-19, 22, and 24-30 remain unchanged. Claims 31-60 have been withdrawn. No new matter has been added to the amended claims.

Claims 8 and 20-21 are rejected under 35 U.S.C. § 112, second paragraph as being indefinite.

Claims 1-4, 9-10, 18-19, and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bergstedt et al. (WO 01/29890) in view of Degani et al. (6,396,711).

Claims 11-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bergstedt et al. in view of Degani et al. and further in view of Lytle et al. (2004-0087053).

Claims 5 and 24-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bergstedt et al. in view of Degani et al. and further in view of Cunningham et al. (2002-0181838).

Claims 1, 6, 15-17, 22, and 30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Syllaios et al. (2004-0219764) in view of Degani et al.

Claim 27 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Syllaios et al. in view of Degani et al. and further in view of Beyne et al. (6,566,745).

As amended, all the pending claims of the subject application comply with all requirements of 35 U.S.C. Accordingly, the Applicant requests examination and allowance of all pending claims.

Restriction Requirement

During a telephone conversation on October 6, 2005 with Examiner Brown, a provisional election was made with traverse to prosecute claims 1-30. The Applicant hereby affirms this election.

Claim Rejections - 35 U.S.C. § 112

Claim 8 has been amended to depend from claim 7. Thus, amended claim 8 provides proper antecedent basis for the limitation "the standoff layer."

Claims 20 and 21 have been amended to clarify the claim elements. In particular, claim 20 has been amended to recite, in part, "wherein each of the recessed regions has a depth ranging from about 0.4 mm to about 1.0 mm." Support for this claim amendment is found in the specification, for example, at paragraph [0026]. Claim 21 has been amended to recite, in part, "wherein the lower surface of the standoff region has a root mean square surface roughness of less than or equal to 2 Å for a 2 μm by 2 μm area." Support for this claim amendment is found in the specification, for example, at paragraph [0047].

Therefore, the Applicant respectfully submits that the Examiner withdraw the §112 rejections of claims 8, 20, and 21.

Claim Rejections - 35 U.S.C. § 103(a)

Claim 1 recites "providing a transparent member of a predetermined thickness, the transparent member including a plurality of recessed regions within the predetermined thickness and arranged in a spatial manner as a second array, each of the recessed regions being bordered by a standoff region, each of the recessed regions having a depth defined by a portion of the predetermined thickness, wherein the depth ranges from about 0.1 mm to about 1.0 mm." The Applicant respectfully submits that these claim elements are not taught or suggested by the cited references, either taken alone or in combination.

Embodiments of the present invention provide hermetically sealed packages for optical micro-mirror devices. Merely by way of example, a two-dimensional array of micro-mirrors suitable for a display application is hermetically sealed in a package according to an embodiment of the present invention. As described in the Background of the Invention, conventional packaging techniques do not provide the optical and mechanical properties suitable for such a MEMS packaging application.

As recited in claim 1, the depth of the recessed regions, in which the chips including a plurality of devices are sealed, is a predetermined depth. As will be evident to one of skill in the art, the optical quality of the surfaces of the transparent member as well as the

distance from the surfaces of the transparent member to the plurality of devices are important design considerations for display applications. Embodiments of the present invention provide recessed regions with a depth (i.e., the distance from the top of the recessed region to the bottom of the transparent member) of between 0.1 mm and 1.0 mm. For display applications, an important optical design criterion is that scratch and dig imperfections in the surfaces of the transparent member, as well as imperfections in the bulk of the transparent member, are outside the depth of focus of the optical system. When this criterion is met, the impact of scratches, imperfections, and the like in the surfaces and bulk of the transparent member on the optical performance of the system are reduced. Accordingly, embodiments of the present invention utilize recessed regions with depths between about 0.1 mm and about 1.0 mm, placing the surfaces of the transparent member outside the depth of focus of the optical system used in display applications.

Bergstedt discusses a method of hermetically sealing a sensor fabricated on a silicon wafer using a paste containing sodium ions and a glass wafer. Bergstedt does not teach or suggest recessed regions having a depth ranging from about 0.1 mm to about 1.0 mm, among other claim elements. On the contrary, Bergstedt illustrates embodiments in which cavities 290 are formed by "sealing frames 270 of a paste material containing Na-ions" printed using a screen printing technique. (Bergstedt at p. 5, lines 16-20). The Applicant believes that Bergstedt merely discloses conventional bonding techniques used in packaging mechanical microsensors, in which spacing between the mechanical microsensors and the package lid are several to tens of microns, not about 0.1 mm to about 1.0 mm. As is well known to one of skill in the art, such conventional bonding techniques are not suitable for optical micro-mirror device packages, in which not only the formation of a hermetic seal, but optical performance measures are important.

Thus, in contrast with embodiments of the present invention, Bergstedt does not teach or suggest a cavity with a depth greater than about a hundred microns and up to about 1.0 mm as recited by claim 1. Moreover the other cited references do not make up for this deficiency in Bergstedt. In particular, Degani, with reference to FIG. 2, describes a package for an optical MEMS structure in which "the sidewalls of the chamber are constructed with silicon wafers 34, 35, and 36." "The top of the chamber 40 is capped with a transparent windowpane 38." "It is preferred that the opening in the wafer 36 be larger than the width of the window.

This allows the window pane, which comprises the only material forming the chamber which is not precisely thermomechanically matched, to "float." (Degani at col. 3, line 56 - col. 4, line 17).

The windowpane of Degani does not teach or suggest the transparent member as recited in claim 1. Rather, the package discussed by Degani appears to be a hybrid package of varying materials, necessitating a space "between the chamber wall at the windowpane seat, and the windowpane itself" to provide for thermal expansion of the dissimilar materials. (Degani at col. 4, lines 17-20). Thus, Degani utilizes a structure similar to that described with reference to FIG. 2 of the present specification, a conventional package for optical micro-mirror arrays. For at least these reasons, the Applicant respectfully submits that claim 1 is in a condition for allowance.

Syllaios also discusses a method of hermetically sealing mechanical microsensors, such as bolometers, gyros, or accelerometers, inside a silicon lid wafer. Syllaios discusses the use of a silicon lid wafer with cavities 34 etched into the silicon lid wafer 30. (Syllaios at paragraph [0021]). As illustrated in FIGS. 1 through 5, Syllaios appears to bond the annular regions 32 to corresponding annular regions 16 surrounding each device 12. Thus, Syllaios does not teach or suggest "hermetically sealing each of the chips within one of the respective recessed regions by contacting the standoff region of the transparent member to the plurality of first street regions and second street regions using at least a bonding process to isolate each of the chips within one of the recessed regions." Rather, Syllaios merely discusses bonding annular regions. Moreover, the other cited references, either taken alone or in combination, do not make up for this deficiency in Syllaios. For at least these reasons, claim 1 is in a condition for allowance.

Claims 2-30, which depend from claim 1, are in a condition for allowance, for at least the reasons discussed in relation to claim 1, as well as for the additional limitations they recite.

CONCLUSION

In view of the foregoing, the Applicant believes all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

Craig C. Largent
Reg. No. 56,400

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 650-326-2400 / Fax: 415-576-0300
CCL/ka
60729037 v1